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ABSTRACT

This module focuses on conservation measures to gain energy. Students are asked to list various conservation measures they can make at home and in their personal transportation; from these they determine the gain associated with each measure. The students are also asked to consider conservation measures in terms of effect on lifestyle. An optional activity includes a publication of a newsletter for the community. One class period is required to implement the module. (Author/BE)

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CONSERVATION NOT CONVERSATION (OR MORE ACTION AND LESS TALK)

TEACHER'S GUIDE

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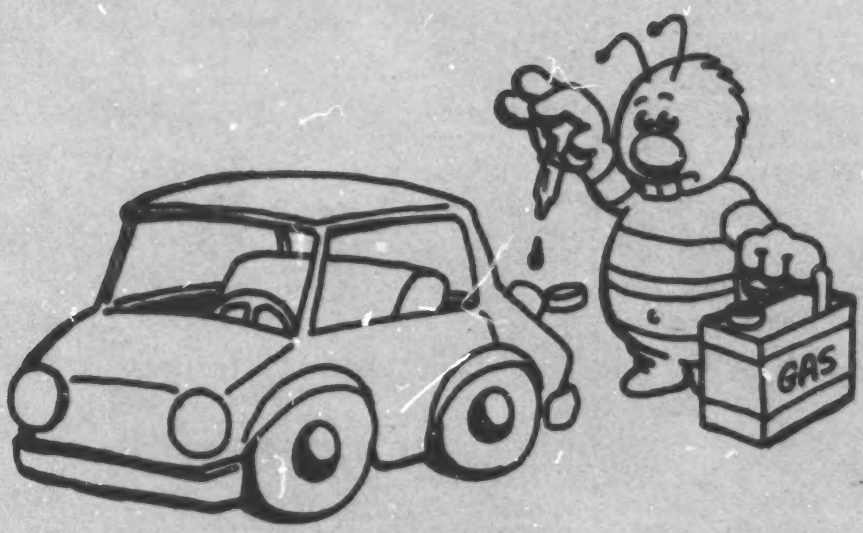

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SE 030 984

"CONSERVATION NOT CONVERSATION (or MORE ACTION AND LESS TALK)"

By Richard J McLeod

Unit Title: Net Energy

Module Title: Conservation not Conversation (or More Action and Less Talk)

Description of the Module: This module focuses on the highest energy gain system of all - conservation measures. In this module, the students are asked to list various conservation measures that they can make at home and in their personal transportation and determine the gain associated with each measure. Finally, they are asked as a group to consider conservation measures in terms of their effect on lifestyle. An optional activity includes a publication of some sort or a newsletter to the community that would increase public awareness of conservation measures they can make and the relative pay off.

Unit Objectives Met: 2e, 3b, 3c, 5d, 5e

Materials Needed: None

Module Type: Required - Final decision-making module

Context: Science, Social Science, other

Time Required: One class period

Mode: Class discussion

Sample test items

The Youth Energy Project is funded by the Michigan Department of Commerce and the Michigan Energy Extension Service on a pilot basis. Michigan State University's Cooperative Extension Service (4-H - Youth Programs) and Science and Mathematics Teaching Center are the project contractors. This material was prepared with the support of the U.S. Department of Energy (DOE) Grant No. EC-77-6-01-5092.

SAMPLE TEST ITEMS FOR MODULE ON CONSERVATION

1. List three energy conservation measures that you have taken or intend to take within the next year.
2. Which of these represent the highest gain? Why?
3. Which of these represent the lowest gain? Why?
4. If you were to install window shades at a cost of $100 and found that they would save $30 per year, what would the gain be if the shades last five years? Ten years? Twenty years? What assumptions are you making concerning energy savings and dollar cost in this calculation?

Answer: If 5 years; $g = \frac{30 \times 5}{100} = \frac{150}{100} = 1.5$

If 10 years; $g = \frac{30 \times 10}{100} = \frac{300}{100} = 3$

If 20 years; $g = \frac{30 \times 20}{100} = \frac{600}{100} = 6$

Assumption: Energy cost and dollar cost are directly related.

CONSERVATION NOT CONVERSATION (OR MORE ACTION AND LESS TALK)

This module will be most effective when used in a combination homework and class discussion mode. As a homework assignment, the students could list the ten things that they or their parents could do to save energy in the home and in personal transportation that don't require any expenditure of energy. This is the first part of Activity 1. Then, the class might discuss these to increase awareness of the variety of energy conservation measures that people can take that fall in this category. During the class discussion, compile a list of all the activities that the class has suggested. It is quite possible that this might be a list of 30 to 40 conservation measures.

As a class, discuss how one might divide this list into the three columns as described in Activity 1. It is important during this activity to come to grips with the question of what we mean by "quality of life." For many of us, a high quality of life has come to be synonymous with an energy intensive way of life. Perhaps, we need to reevaluate the question of whether more and more consumer goods and more and more uses of energy really improve our quality of life. In many cases the "energy saving" devices result in a more sedentary type of life that, in fact, reduces our quality of life. This activity can have great impact if the students really get into the philosophy of "quality of life."

CONSERVATION NOT CONVERSATION (or MORE ACTION AND LESS TALK)

Ben Franklin once said that a penny saved is a penny earned or something like that. Of course, that was before inflation. Nevertheless, Ben Franklin's old adage is right on the button as far as energy is concerned. In fact, every unit of energy saved is worth at least two that are still in the ground. But let's be conservative! We will count only the energy saved as energy earned.

Activity 1

Name at least 10 things that you or your parents could do to save energy in your home and personal transportation that DON'T REQUIRE ANY ENERGY (other than, perhaps, your own personal energy).

Example: 1. turn back thermostats - no energy required.

2. reduce speed when driving

For these, the gain (g) is so large it approaches infinity. Why? Discuss this list as a class and compile a class list of activities. Divide the total class list into three columns:

A. those that save energy and really don't change my quality of life (or improve it).

B. Those actions which do affect my quality of life, but not so much that I would hesitate to do it.

C. Those actions which save energy but really make a dent in my quality of life.

Order this list on the basis of those which represent the largest savings (hence, the largest gain if we disregard the zero denominator).

Activity 2

Repeat Activity 1 for actions that you could take that require a relatively small input of energy but will produce an energy gain in its lifetime of use. Estimate the gain by assuming that the ratio of dollars saved to the dollars invested is roughly equivalent to the rate of the energy saved to the energy invested. Thus,

$$g = \frac{E_o}{E_f} \quad \text{becomes} \quad g = \frac{\text{dollars saved}}{\text{dollars invested}}$$

$$= \frac{Ds}{Di}$$

Example: hot water tank insulation costs about $20, but will save about $60/year and have a life expectancy of at least 10 years.

$$g = \frac{60 \times 10}{20} = 30$$ A very impressive gain!

*The assumption that dollars and energy are roughly equivalent is not altogether true but is close enough to give us a reasonable indication of the energy gain in various measures. There are a large variety of publications produced by university cooperative extension services, government offices, etc. that will give projected savings. The power companies also have charts that will help the students arrive at dollar savings.

Activity 3

Publish a newsletter to the community in which your findings are published.

*This activity, while optional, might provide a real sense of accomplishment for the student if their results could be published in some sort of a newsletter that is sent home in the school mail. The school could also consider this an act of public service. Perhaps your class could work with the journalism or other appropriate class in developing such newsletters or news releases.

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